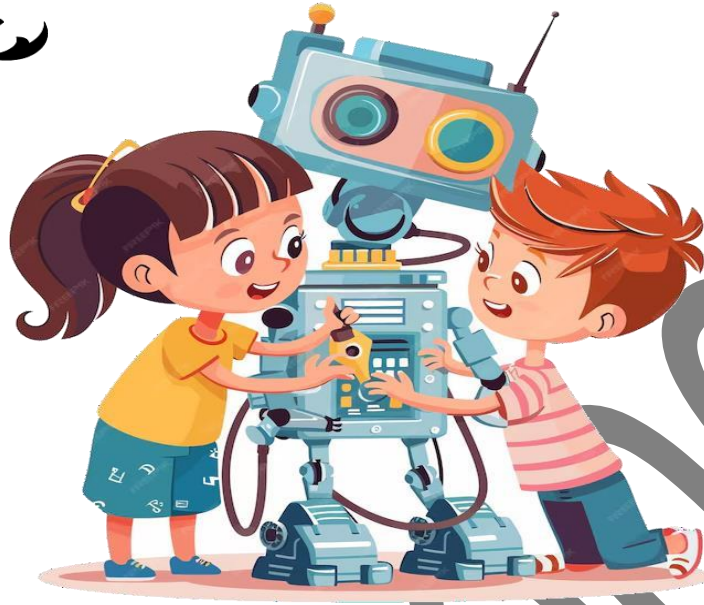




Computer and Information Technology

First grade
Preparatory 2nd Term

Name: -

Class: -

Lesson 1: -

Artificial Intelligence applications

Artificial intelligence is not just one type, but there are many and varied types. Imagine that we have a large garden full of different flowers, each flower has a different shape and color, and so is the case with artificial intelligence

Types of Artificial Intelligence

1. Narrow Artificial Intelligence (NAI):

This type of AI is characterized by its focus on performing specific tasks.

◦ Examples:

- Face recognition programs.
- Language translation tools.
- A robot that plays chess brilliantly but cannot perform other tasks.

2. General Artificial Intelligence (GAI):

More advanced AI that can perform any task that a human can perform.

◦ Examples:

- Robots that think, create, solve complex problems, and adapt to different situations, completely imitating human capabilities.

3. Super Artificial Intelligence (SAI):

- The most advanced AI, it can solve problems that are difficult for human to solve easily.

- It discovers new things that we have never imagined before.

Applications of AI in Daily Life

1. Personal Assistant:

- Tools like Siri or Alexa act as virtual friends, understanding and executing commands.

2. Smart Games:

- Video games use artificial intelligence to provide an enjoyable experience and increasing challenges as characters learn from their mistakes.

3. Smart Cars:

- Self-driving cars, a dream of the future that is getting closer to becoming a reality thanks to AI

4. Digital Doctors:

- Artificial intelligence helps doctors diagnose and treat diseases quickly and accurately.

5. Instant Translator:

- AI facilitates communication by translating words and sentences between languages instantly.

6. Smart Shopping:

- Shopping sites use AI to analyze user behavior and suggest products that suit their preferences.

Artificial Intelligence Fields

1. Machine Learning - learning from mistakes:

o AI learns from data and experiences, just as humans learn from their mistakes.

o Examples:

- Training AI to recognize cats by showing it multiple images.

2. Natural Language Processing (NLP) –understanding languages:

- AI understands human languages and interacts with them in writing or speech.

o Examples:

- Virtual assistants or smart chat.

3. Computer Vision – see the word:

- AI interprets visual data to identify objects, faces, and patterns.

o Examples:

Recognizing faces in images

4. Robotics:

- Robots powered by AI perform tasks such as cleaning, surgery, or playing chess, even in dangerous environments.

5. Expert Systems (simulation of human thinking and decision making):

- AI mimics human thinking to make decisions and solve complex problems.

o Examples:

- Diagnosing diseases using artificial intelligence.

6. Deep Learning (simulation of human learning) :

- A branch of AI that aims to simulate human learning through neural networks.

◦ Examples:

Systems that learn to recognize sounds, images, or patterns very quickly.

Create Smart Models with Teachable Machine

Teachable Machine is an easy-to-use tool that lets you create smart AI models that recognize images, audio, and pose project .

• Steps to use:

1. Visit the [Teachable Machine](#) website.
2. Make sure your browser is up to date (preferably Microsoft Edge).
3. Try training AI models in collaboration with your colleagues.

Model Building Training: Imagine that you are training a young child to do new things! First, you need to teach him the names of things.

- You show the young child a picture of a cat and say, “This is a cat,” then you show him a picture of a dog and say, “This is a dog.”
- You are telling the child what things he sees, just as you teach him the names of letters and numbers. 10
- After the young child sees a lot of pictures and hears names, his little brain starts to understand the difference between a cat and a dog, just like when scientists try to train a computer to understand pictures and sounds.

- The child has learned so well that he can now tell the difference between a cat and a dog on his own, and in the same way, the computer has learned to recognize different things, and we can use it for a lot of fun things!

Practical example: Suppose you want to make a game where you control a character on the screen with your hand movement, here are the steps:

- **Training:** You record your hand in different positions (such as raising the hand, lowering it, moving it right and left).
- **Recognition:** Teachable Machine learns to associate each position of your hand with a specific movement of the character on the screen.
- **Game:** When you move your hand in front of the camera, the character on the screen moves according to what the computer has learned

Lesson 1 Exercises (Artificial Intelligence Applications)

Q 1: Put (True) in front of the correct statement and (False) in front of the incorrect statement:

1. Artificial intelligence is only used in the electronic games industry. ()
2. Artificial intelligence can help doctors diagnose diseases. ()
3. Self-driving cars depend entirely on artificial intelligence. ()
4. Artificial intelligence can learn new things slowly. ()
5. Artificial intelligence is a science of computer science. ()
6. For artificial intelligence to become intelligent, it needs small amounts of information. ()
7. Artificial intelligence is only one type. ()
8. Narrow artificial intelligence can perform any task that a human can perform. ()
9. General artificial intelligence is the most advanced. ()
10. General artificial intelligence focuses on performing a specific task. ()
11. Super artificial intelligence can solve specific problems. ()
12. Smart Games are used to make playing more fun. ()
13. Instant Translator is used to facilitate communication between people. ()
14. Smart Shopping gives you suggestions for products you might like. ()
15. Natural language processing is like a machine language translator. ()
16. Robots are characterized by doing many tasks with great accuracy. ()

Q 2 Choose the correct answer from the following options

1. What is the type that focuses on performing specific tasks?

- A. General Artificial Intelligence (GAI)
- B. Narrow Artificial Intelligence (NAI)
- C. Super Artificial Intelligence (SAI)

2. What field allows artificial intelligence to understand human languages?

- A. Computer Vision
- B. Machine Learning
- C. Natural Language Processing (NLP)

3. Which of the following is an example of General Artificial Intelligence

- A. A robot playing chess
- B. A self-driving car
- C. A robot that solves complex problems and adapts to different situations

4. What field enables artificial intelligence to recognize images and faces?

- A. Natural Language Processing
- B. Computer Vision
- C. Deep Learning

5. What does Teachable Machine use?

- A. Machine Learning
- B. Natural Language Processing
- C. Expert Systems

6. What is the most advanced type of Artificial intelligence?

- A. General Artificial Intelligence
- B. Narrow Artificial Intelligence
- C. Super AI

7. Which field is used to create robots that operate accurately in dangerous

- A. Machine learning
- B. Robotics
- C. Expert systems

8. Which of the following is an application of AI in everyday life?

- A. Personal assistants like Siri
- B. Cycling
- C. Hand typing

9. What is Deep Learning?

- A. AI simulating human learning
- B. Text translation
- C. Image understanding

10. Which field enables AI to make complex decisions such as diagnosing diseases?

- A. Expert systems
- B. Computer vision
- C. Natural language processing

Lesson 2: - Sensors

Sensors: They are devices that sense changes in the surrounding environment and convert them into signals so that machines and devices can understand them and make appropriate decisions based on them. They are considered the eyes and ears of machines.

How do sensors work?

Sensors work in three main steps

1. **Sensing:** Captures information from the surrounding environment such as heat, light, or sound.
2. **Signal conversion:** Converts this information into electrical signals.
3. **Transmission:** The signals are sent to another device to display the results or perform a certain operation (such as displaying the temperature on a digital screen).

The importance of sensors for robots: Imagine robots without sensors, they would be like a person walking with their eyes closed and their ears covered, they cannot recognize what is happening around them or recognize those around them or how to behave, here comes the importance of sensors, they represent the "senses" of the robot, helping it to see, hear, sense, and even touch things around it.

Types of Robotic Sensors

1. **Distance sensors:** Measure the distance between the robot and surrounding obstacles, helping the robot avoid collisions.
2. **Light sensors:** Adapt to different lighting conditions, and are used in home robots.
3. **Sound sensors:** Detect sounds and respond to voice commands.
4. **Motion sensors:** Detect movement and help with navigation.
5. **Special sensors:** Measure specific parameters such as temperature and humidity.

Some examples of electronic devices that use sensors:

- **Vacuum cleaner robot:** uses sensors to avoid obstacles and clean under furniture.
- **Surgical robot:** uses precise sensors to perform surgeries.
- **Self-driving cars:** rely heavily on sensors to see the road and make decisions

Applications of Sensors in Everyday Devices

1. **Touch screen:** It is a group of small sensors that sense where your finger touches the screen.
2. **Self-driving cars (modern cars):** use sensors to navigate, detect obstacles, and make decisions.
3. **Smartphones:** help in photography, adjusting lighting, and determining locations.
4. **Smart homes:** motion sensors automatically turn on the lights when you enter a room.
5. **Gaming devices (motion sensor in games):** sensors change the direction of the game based on the Device movement
6. **Phone microphone:** It is a sound sensor that converts the sound you pick up into electrical signals that can be understood by the phone

Types of distance sensors

1. **Ultrasonic sensors:**

✓ **How they work:** They emit high-frequency sound waves and receive the reflected waves to determine the distance.

✓ **Examples:**

- Robotic vacuums to avoid obstacles.
- Parking systems to determine distances.
- Determining fluid levels in tanks.



2. **Laser rangefinders:**

✓ **How they work:** They emit a laser beam and determine the time it takes for it to return, providing high accuracy.

✓ **Examples:**



- **3D scanning systems** (They are used to create 3D models of spaces.).
- **Ground scanning systems** (They are used in geological and archaeological surveys).
- **Industrial measurement systems** (They are used to measure dimensions with high accuracy in various industries).

3. Visible light sensors:

✓ **How they work:** Cameras are used to analyze images and determine distances based on the size and distortion of the image.

✓ Examples:

- **Self-driving car cameras** (used to determine the distance to other cars, pedestrians, and traffic signals).
- **Industrial vision systems to inspect products** (used to inspect products and identify errors).
- **Augmented reality systems** (used to integrate digital elements with the real world).



4. Infrared sensors:

✓ **How they work:** They emit infrared rays and receive the reflected waves to identify objects.

✓ Examples:

- **Remote controls** (Infrared rays are used to communicate with electronic devices).
- **Non-contact temperature measuring devices (thermometers).**



5. Time of flight sensors:

✓ **How they work:** They measure the time it takes for a light pulse to reach an object and return.

✓ Examples:

- **3D sensors for modeling objects** (Used to create 3D models of objects).
- **Motion tracking systems in games and virtual reality.**

Factors for choosing the right sensor

- **Required range:** the maximum distance to be measured.
- **Required accuracy:** the level of accuracy required.
- **Operating environment:** lighting conditions, temperature, and humidity.
- **Cost:** the cost of the device and installation.

Lesson 2:- Exercises (Sensors)

Question 1:- Put the word (True) in front of the correct statement and the word (Incorrect) in front of the incorrect statement:

1. Sensors convert changes in the surrounding environment into electrical signals that devices can understand. ()
2. Sensors are only used in robots and are not used in the manufacture of smartphones or cars. ()
3. Distance sensors help robots avoid collisions with surrounding obstacles. ()
4. Infrared sensors work by emitting high-frequency sound waves. ()
5. Environmental conditions, such as humidity and temperature, can affect the choice of the appropriate type of sensor. ()

Question 2:- Choose the correct answer from the following answers: (Textbook Exercises) Answered

1.The primary function of a sensor is

- A. Store data B. Capture environmental changes and convert them into signals
C. Display images

2.Sensors help robots to.....

- A. Teach them new languages B. Allowing it to interact with its environment
C . Increase its size

3.A type of sensor used to avoid obstacles.

- A. Light sensors B. Sound sensors C . Distance sensors

4.The first step in the operation of a sensor is

- B. Transmitting B. Displaying C. Sensing

5. Commonly used in remote controls.

- A. Ultrasonic sensors B. Infrared sensors C . Light sensors

6.Laser rangefinders are accurate because they use

- A.Sound waves B. High frequency waves C. Laser beams

7.A common application of sensors is the use of infrared in.....

- A.Smartphones B. Remote controls C . Vacuum cleaners

8.In which environment are light sensors useful?

- A.In dark rooms B. In places with changing lighting conditions C .



In underwater environments

9. One of the sensors that are used to measure distance using high frequency sound waves.

- A. Ultrasonic sensors B. Laser rangefinders C. Motion Sensors

10. Sensors are used to turn on lights when someone enters the room.

- A. Smartphone B. Smart car C. Smart home lighting system

11. It is used to measure temperature without contact.

- A. Ultrasonic sensor B. Infrared sensor C. Light sensor

12. The main purpose of the signal conversion step in sensors is.

- A. Sending signals to another device
B. Converting information into electrical signals C. Turning off the sensor

13. It helps cars determine the distance to other vehicles.

- A. Sound sensors B. Visible light sensors C. Distance sensors

14. is the practical use of motion sensors in games.

- A. Changing the volume B. Adjusting the screen brightness
C. Tracking the movements of players

15. Factors that determine the choice of a sensor for a particular application.

- A. Device brand B. Device color
C. Environment and required accuracy

Lesson 3: - Robot

1. What is a robot?

A robot is a device that can be programmed to perform specific tasks automatically. A robot is characterized by its ability to move, sense (using sensors), and interact with the surrounding environment. Robots are used in many fields that require precision, speed, or safety. **example:** A vacuum cleaner that moves independently to clean the floor is a type of robot that works automatically

2. Types of Robots

Robots vary according to their uses into several types:

- 1. Industrial robots:** They are used in factories to perform tasks accurately and quickly, such as car production.
- 2. Home robots:** They help perform household tasks, such as cleaning robots like "Roomba", which automatically clean floors.
- 3. Medical robots:** They assist doctors in surgeries and other medical procedures with high accuracy.
- 4. Educational robots:** They are used in schools to teach programming and technology, such as "LEGO Mindstorms" robots that are programmed to perform specific tasks and help students and teachers.

3. Areas of Use of Robots (robotic application)

Robots are used in many areas, including:

- 1. Industry:** Improving productivity and reducing errors in manufacturing.
- 2. Healthcare:** Assisting in surgeries and patient care, improving medical outcomes.
- 3. Education:** Providing interactive learning experiences for students.
- 4. Agriculture:** Improving crops and reducing waste through precision agriculture.



4. Robot Components:

- 1. Structure:** The physical frame made of materials such as metal , plastic and carbon which affects the weight and ability of the robot to move.
- 2. Sensors:** The robot's "senses" that collect information, such as:
 - ✓ Sound sensors: Pick up sounds.
 - ✓ Cameras: Allow the robot to see.
 - ✓ Temperature sensors: Measure temperatures.
- 3. Motors (actuators):** Allow the robot to move. Types include:
 - ✓ Electric motors: For precise movements.Pneumatic(air) motors: For heavy-duty tasks.
- 4. Control unit:** The "brain" of the robot, which processes sensor data and directs movement using microprocessors.
- 5. Power source:** Powers the robot. Sources include batteries, solar cells, or direct electricity.
- 6. Software:** Determines the robot's behavior through algorithms, ranging from simple sensor programs to complex artificial intelligence systems.
- 7. Communication tools:** Enables the robot to interact with users or other robots using technologies such as Bluetooth or Wi-Fi.

5. Benefits of Robots

Robots offer many advantages, including:

- ✓ **Increased efficiency:** Robots operate continuously, which increases productivity and saves time.
- ✓ **High accuracy:** They perform tasks accurately, which reduces human error, such as in surgical operations or the electronics industry.
- ✓ **Improved safety:** Robots take on dangerous tasks, such as dismantling bombs or handling hazardous chemicals, which reduces risks to humans.
- ✓ **Adaptability:** Robots can be programmed to perform different tasks,
- ✓ **Cost reduction.**
- ✓ **Boosting technological development:** Robots support innovation in areas such as space exploration and advanced medical research.

6. Challenges

Despite their benefits, robots face some challenges:

- **Safety issues:** The need to ensure that robots are safe while working.
- **Employment concerns:** The potential for robots to replace human labor.
- **Ethical concerns:** The impact of robots on society and decision-making.

Conclusion

Robots are revolutionizing industries and everyday life by improving efficiency, safety, and accuracy. From home assistants to advanced medical devices, robots show tremendous potential in shaping the future of technology.



Lesson 3 :-Exercises (Robot)

Question 1 Put a check mark (✓) in front of the correct statement and a check mark (✗) in front of the incorrect statement.

1. Sensors do not play a role in the movement of robots and sensing the surrounding environment. ()
2. Robots work is limited to factories only. ()
3. Medical robots help doctors perform surgeries. ()
4. The design of the robot's structure affects its weight and ability to move. ()
5. Vision sensors are used to capture sounds. ()
6. The motors used in robots include electric motors and air motors. ()
7. The control unit processes the data collected by the sensors and issues commands to the motors. ()
8. Robots rely on direct power sources only and cannot use batteries or solar cells. ()
9. Robots do not need programs to work. ()
10. Robots use communication tools to interact with users or other robots. ()
11. The areas of use of robots include industry, healthcare, and education. ()
12. Robots cannot be programmed to perform various tasks as needed. ()
13. Robots help reduce risks to human life in hazardous environments. ()
14. Robots are used in agriculture to grow plants manually only. ()
15. The accuracy of robots in tasks such as assembling electronics improves manufacturing quality. ()

Question 2: Choose the correct answer from the following options:

1. The challenges facing robotics technology include.....:

- A. Increased reliance on paper documents. C. Safety, employment, and ethics.
B. Increased reliance on smartphones. D. Increased reliance on traditional machines.

2. In production, robots can perform repetitive tasks accurately and without any delay, which leads to:

- A. Increased efficiency and productivity. C. Lack of product development.
B. Reduced efficiency and productivity. D. Slow down the production process.

3. Robots help in dangerous tasks such as:

A. Transportation and logistics.

C. Garden and park maintenance.

B. Handling heavy weights and hazardous chemicals.

D. House cleaning.

4. To take pictures and videos, we use sensors:

A. Sound.

C. Light.

B. Touch.

D. Vision.

5. Power sources used in robots include:

A. Solar cells only.

C. Direct power sources only.

B. Batteries, solar cells, and direct power sources.

D. Air motors only.

Lesson 4: - scratch

Scratch program provides a very wide range of ideas that can be programmed, including games, animations, comics, music, simulations, and interactive games for artificial intelligence for the student to learn the principles of programming.



Scratch program allows students to be creative while learning, to feel as if they are playing a fun game while learning, as it is a fun and easy-to-use educational tool that allows learning the basics of programming in a visual and enjoyable way without the need to write a lot of complex codes.

Scratch program features:

- **Simple interface:** Scratch uses a visual interface based on blocks (bricks or commands), which are placed on top of each other in a specific system and order to form programs.
- **Educational program:** Scratch is specially designed to teach basic programming concepts in a fun and exciting way.
- **Free program:** Scratch can be downloaded from its official website and used for free.
- **Developing creative thinking:** Scratch helps learners develop their skills in creative thinking and problem-solving.
- **Enhancing problem-solving skills:** By trying mistakes and learning from them, students learn how to solve problems in a logical way.
- **Developing Collaboration Skills:** Students can work together on Scratch projects, which enhances teamwork skills.
- **An exciting start to the world of programming:** Scratch provides a strong foundation for moving on to more difficult programming languages in the future.
- **Sharing the project:** Projects can be shared with others.

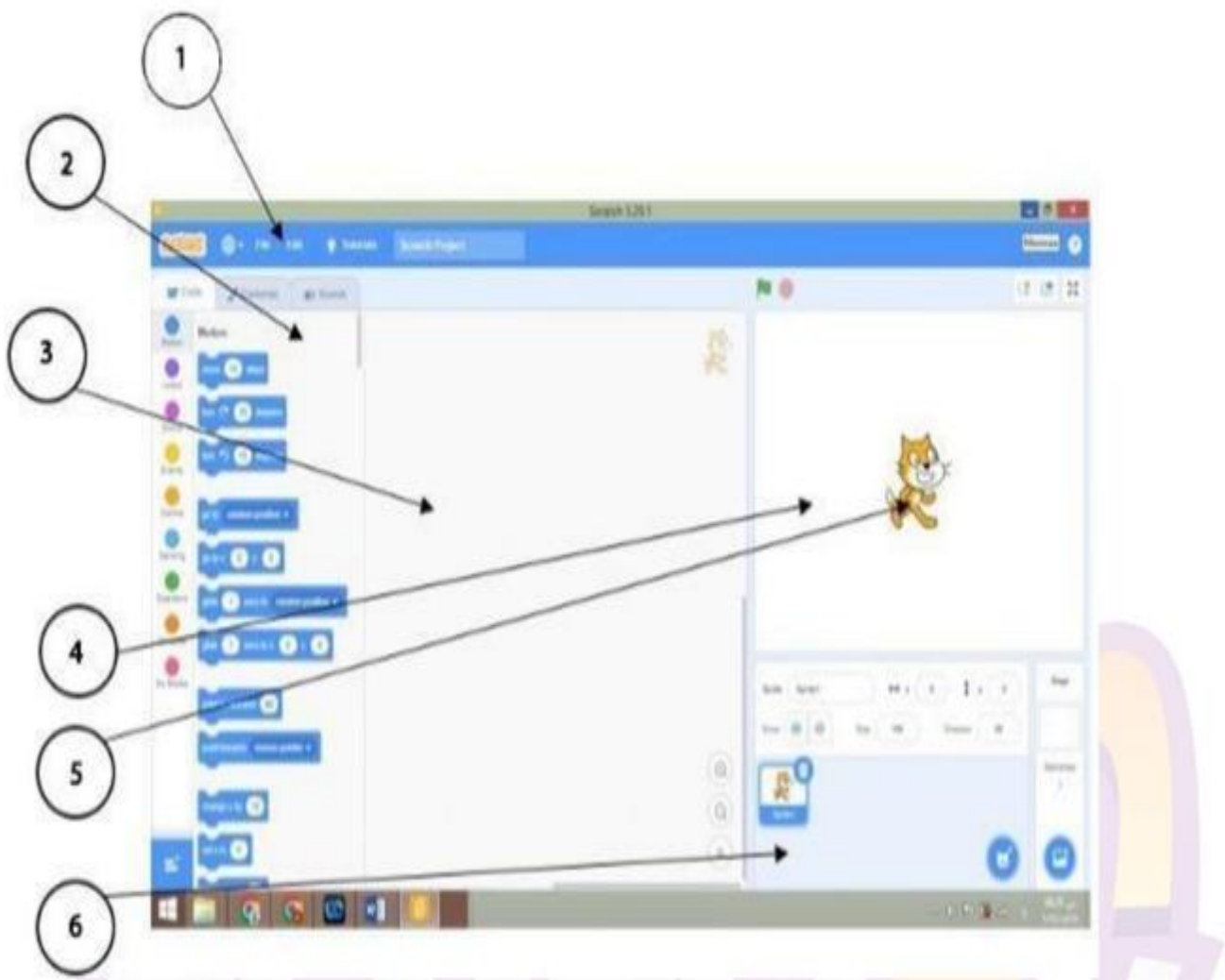
Getting Started with Scratch:

1. **Download:** Scratch can be downloaded for free from its official website, it can be obtained from the Internet through the link <https://scratch.mit.edu>.
2. **Explore:** Explore the interface and learn how the different blocks and commands work.
3. **Create a project:** Start by creating a simple project, such as animating a character or creating a short story.
4. **Save the project.**

Download the program:

Through the following website <https://scratch.mit.edu/download>, the Scratch program is downloaded.

Getting to know the program interface:



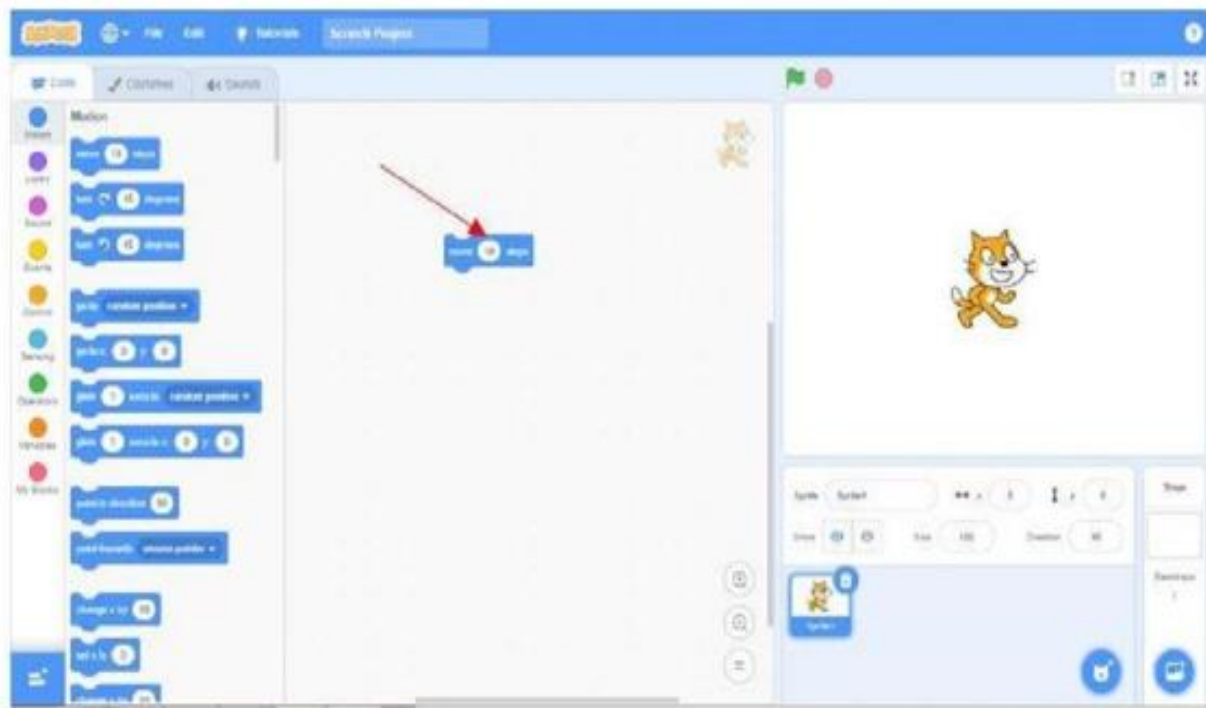
Project (1): What is required in the project is:

- Move the sprite (cat) on the platform or stage "30 steps".
- Then the phrase "Good morning" appears.

Implement the project:

To be able to move the sprite (cat) on the stage, follow these steps:

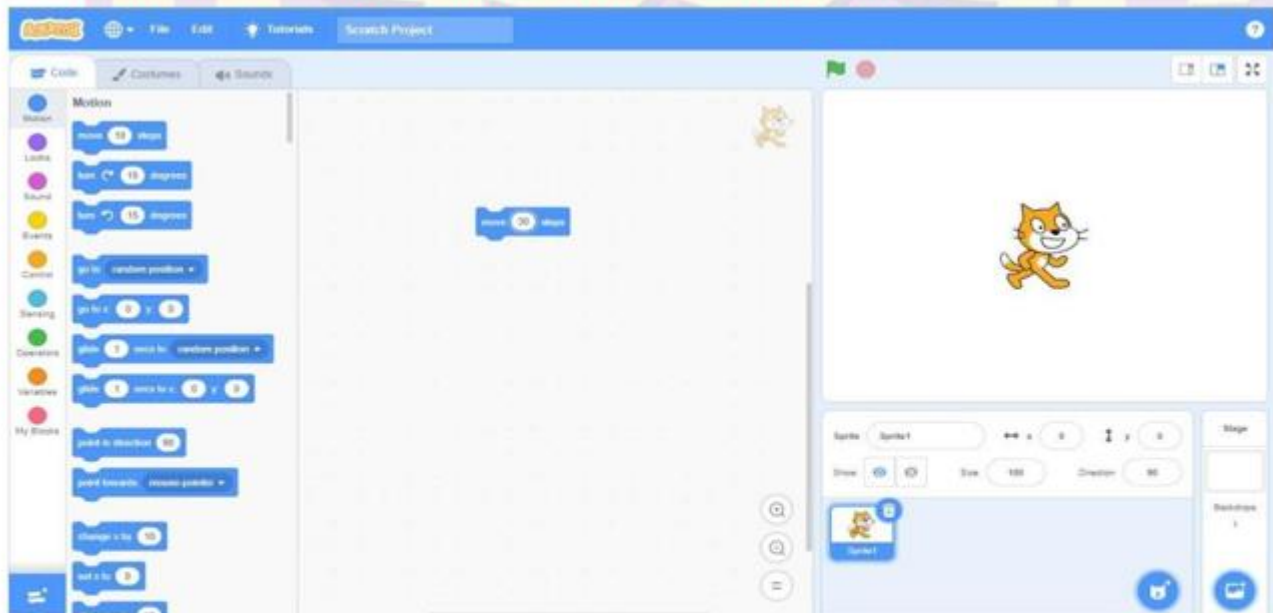
- From the **command blocks** area, **Motion** group, click and drag the command and drop it in the **programming area** Script Area as shown below:



- To make the object's movement steps **30 steps**, double-click on the value 10 on the (**command**) block and write the value 30 as in the following figure:

Write the value 30 on the block as in the following figure:

Write the value 30 on the block as in the following figure:



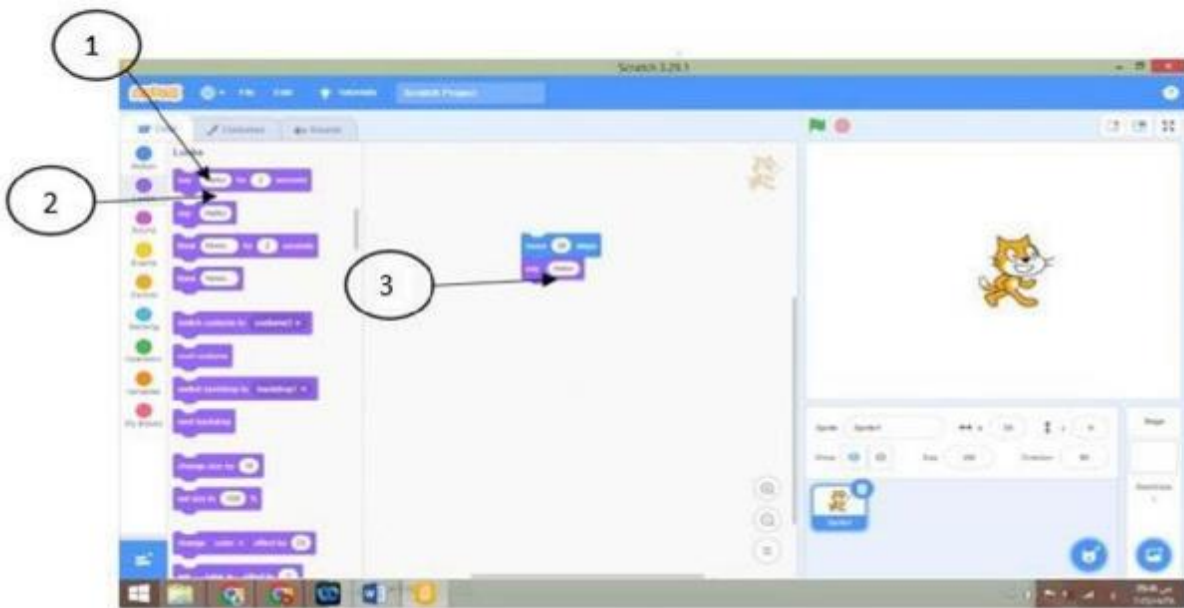
To display the phrase "Hello":

1-Select the **Looks** command

2-Then **select the command**



3-Then **click and drag on the command** and drop it into the platform below the previous command.

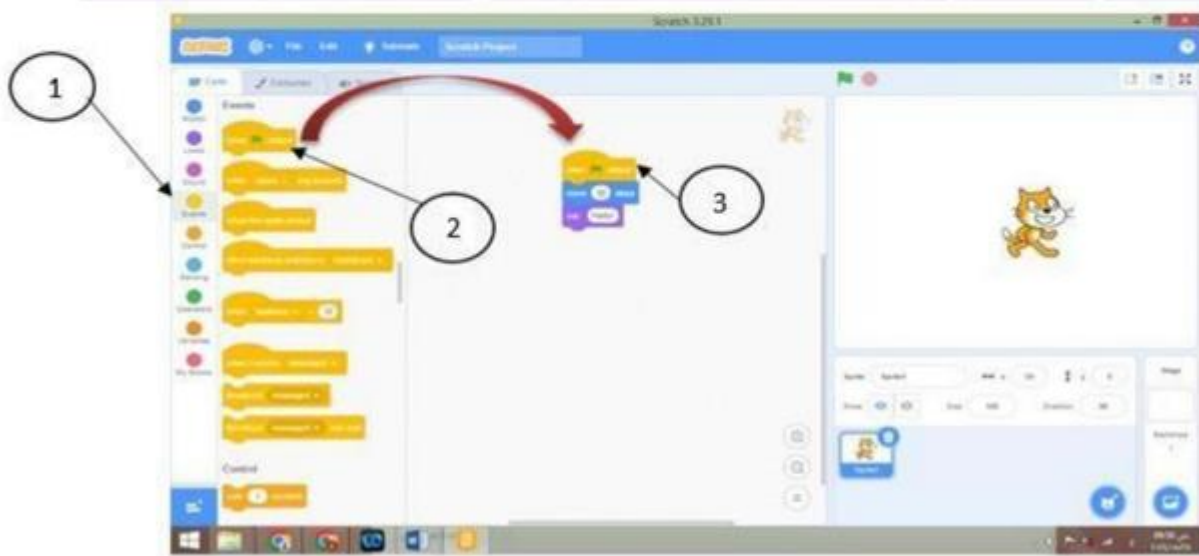


To view the implementation of the project steps

1- In the Script Area, click on **Events Blocks**

2- Click on the command  and drag it to the platform

3- To be installed at the beginning of the programming section as shown in the figure



5- To stop the execution of the project, click on the icon 

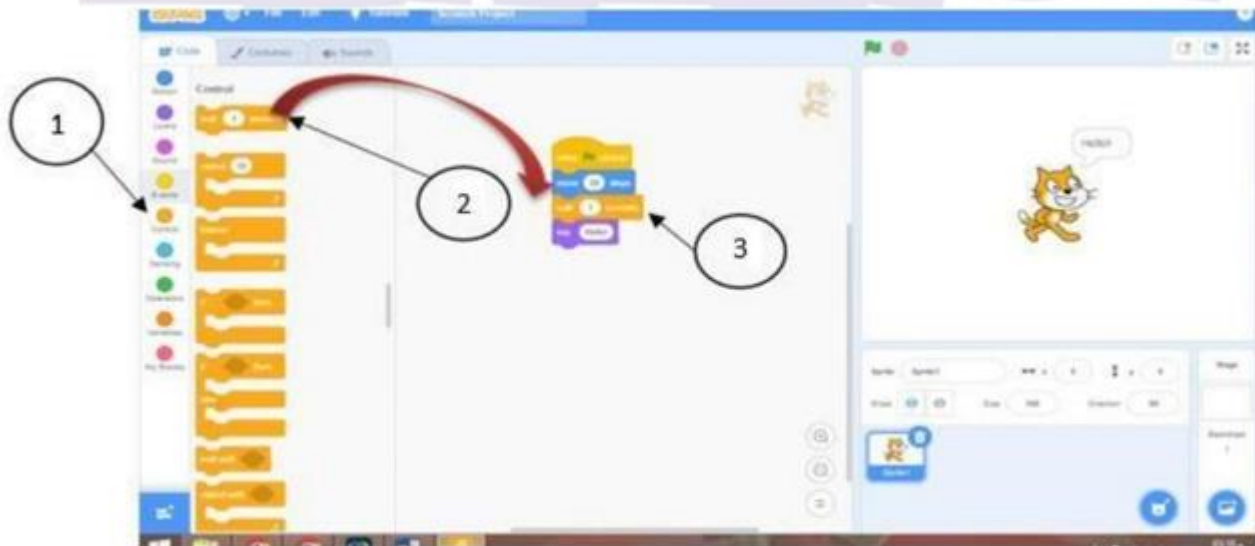


Note: When executing the previous project, we notice that the movement was done quickly. To address this, we can use the Wait command from Control Blocks by following the following:

1- Click on Control Blocks

2- Click and drag a command  and drop it into the **Script Area**

3- Place it as shown below:



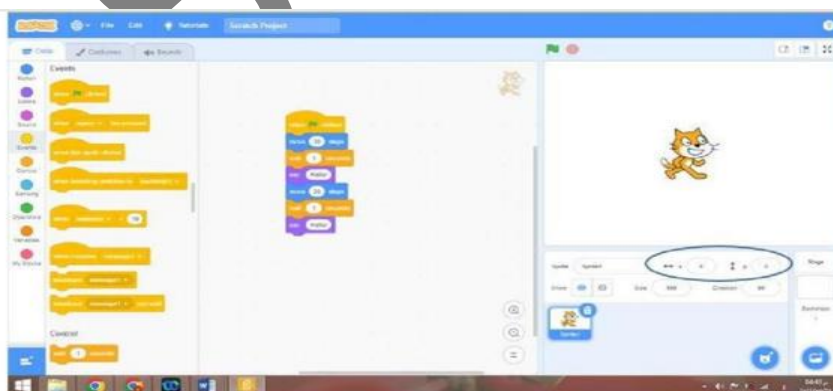
4- To re-execute the project, click on the icon

Important notes:

- The wait value represents (1 second).
- Installing a set of commands in a specific order called a **code section**.
- Use click, drag and drop to deal with any command (within) the code section.

Modify the project (1): Modify the previous project to make the movement continuous

- To make the movement continuous, you can install the command several times
- Re-arrange it by clicking and dragging to the place where you want to start the repetition
- Modify the word "Hello" to the phrase "Good morning".

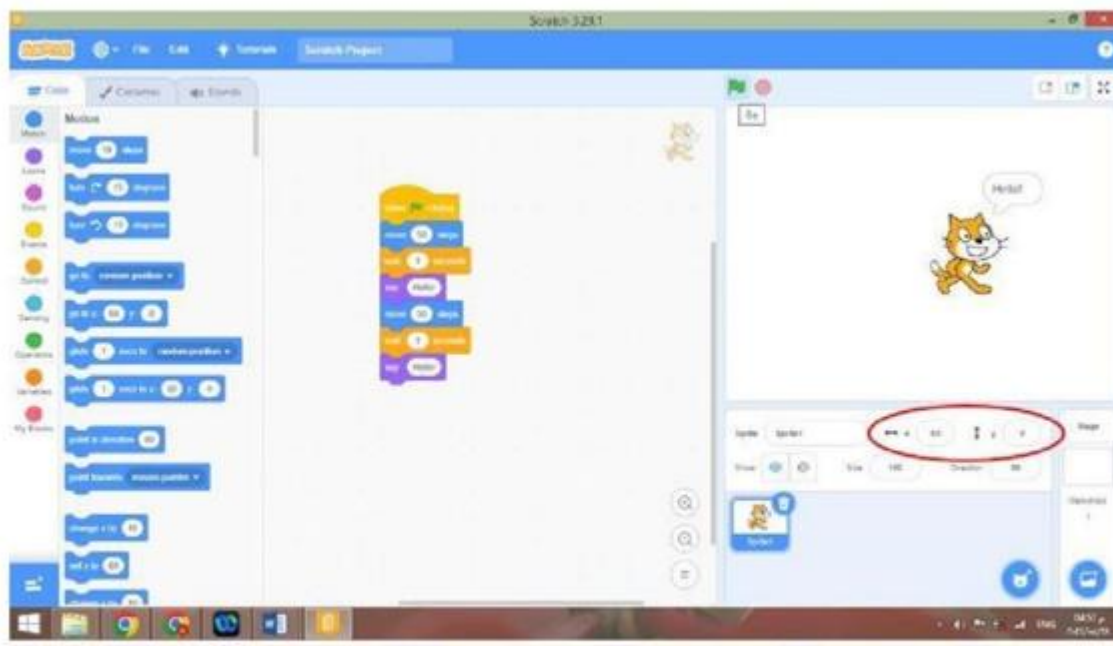


Note that:

Before implementing the project, the value of the object's coordinates on the platform is:

$X=0$ which is the horizontal axis and represents horizontal movement, $Y=0$ which is the vertical axis and represents vertical movement

Implement the project Note the value $X=0$ and the value $Y=0$ after implementing the project

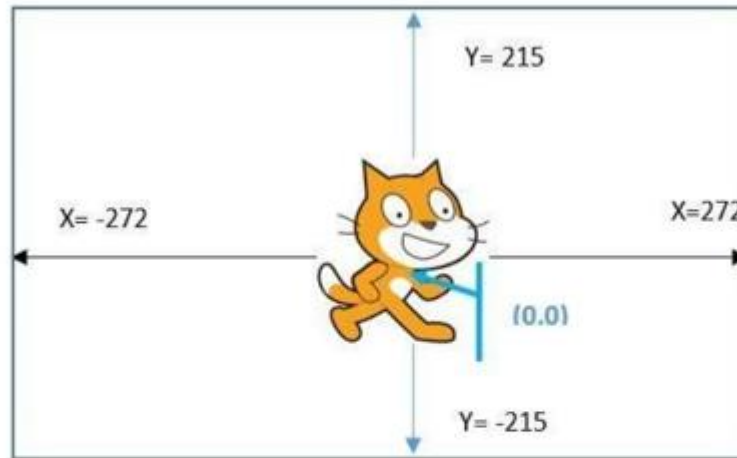


- **You can** control the position of the Sprite on the platform by clicking on it and (drag & drop).

Activity:

With the help of your teacher and in cooperation with your colleagues, discover with them the coordinates of the platform, how can you change the position of the object on the platform?

Discover the coordinates of the platform



- **You can** control the location of the Sprite object on the platform by clicking on it and (drag & drop) to another place on the platform.

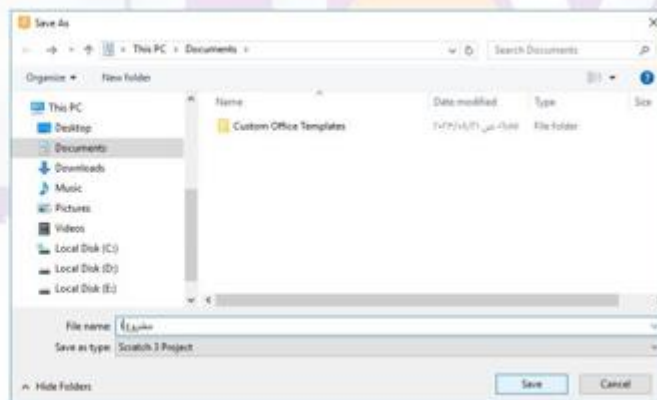
Save the project in a file

To save your project, do the following:

- 1- From the File menu, choose Save to your computer.
- 2- Select a location to save the file on one of the storage media.
- 3- Type the file name "Project 1"

Note that:

- The file name is "Sb3 Project 1"
- The file extension is **Sb3**.



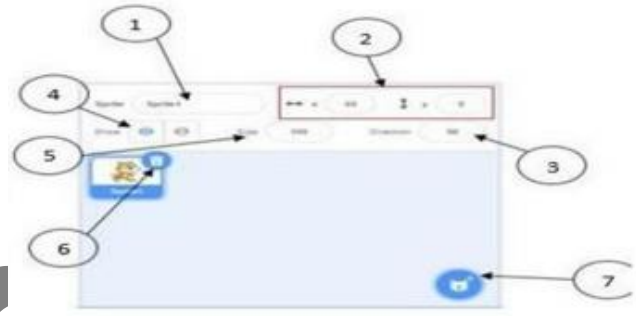
Lesson 4 :-Exercises

1 Choose the correct answer from a, b, c or d.

1. is the main goal of the Scratch program.
 - a. Designing websites
 - b. Teaching the basics of programming in a visual and fun way
 - c. Creating complex programs for professional programmers
 - d. Developing cell phone applications
2. is one of the advantages of the Scratch program.
 - a. Complex interface
 - b. Requires complex coding
 - c. Free and available for download
 - d. Focuses only on advanced programming
3. is the primary function of blocks in Scratch.
 - a. File management
 - b. Organizing code
 - c. Playing acoustics
 - d. Controlling program settings
4. The Scratch program can be downloaded from
 - a. paid App Store
 - b. the official website of the program
 - c. email
 - d. a CD-ROM
5. is an area used to assemble building blocks in Scratch.
 - a. Stage area
 - b. Script Area
 - c. Menu bar
 - d. Sprites Area
6. Purpose of using the "wait" command in Scratch is
 - a. automatically launch the project
 - b. stopping the project
 - c. control the execution time of commands
 - d. change the interface language
7. The Scratch program's interface language can be changed via
 - a. menu bar
 - b. keyboard
 - c. installing the program
 - d. the browser settings

Lesson 5: - sprites area in scratch

- 1- **The name of the sprite** (you can modify it by clicking on it and renaming it).
- 2- **The location of the sprite** and determines it (the horizontal axis is the X values and the vertical axis is the Y values, note the current location of the sprite (cat) on the platform is ((60,0)
- 3- **The direction of the sprite's movement :**
(You can change the direction by changing the Direction value).
- 4- **Show or hide the sprite** on the platform.
- 5- **The size of the sprite** and its value can be changed.
- 6- **Delete the sprite** from the platform.
- 7- **Add a new sprite** Choose Sprite.



Project1

Add a new sprite:

**To add a new sprite in the
sprites area**

-Click on Choose Sprite

Select Basketball

**-Remove the cat sprite from the
stage**



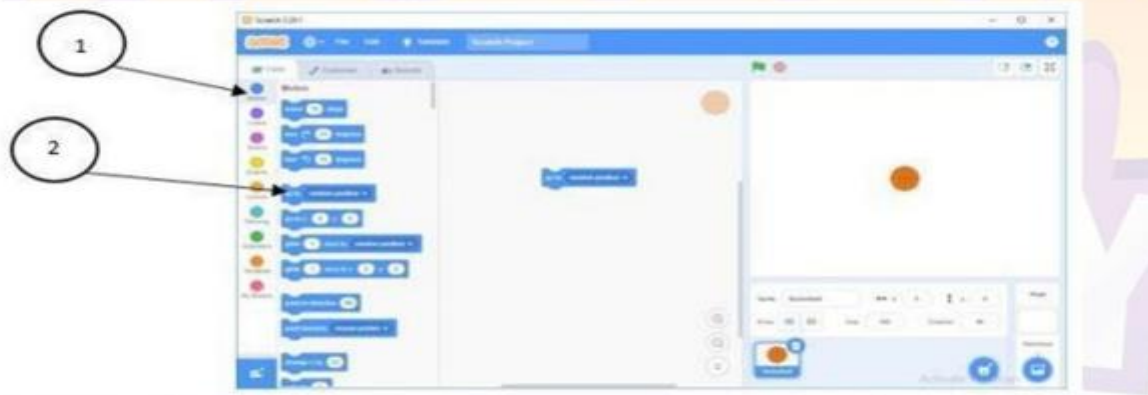
Project 2:

**Required to move the ball randomly on the platform while making a sound for
the ball and repeating this 10 times**

Project creation steps:

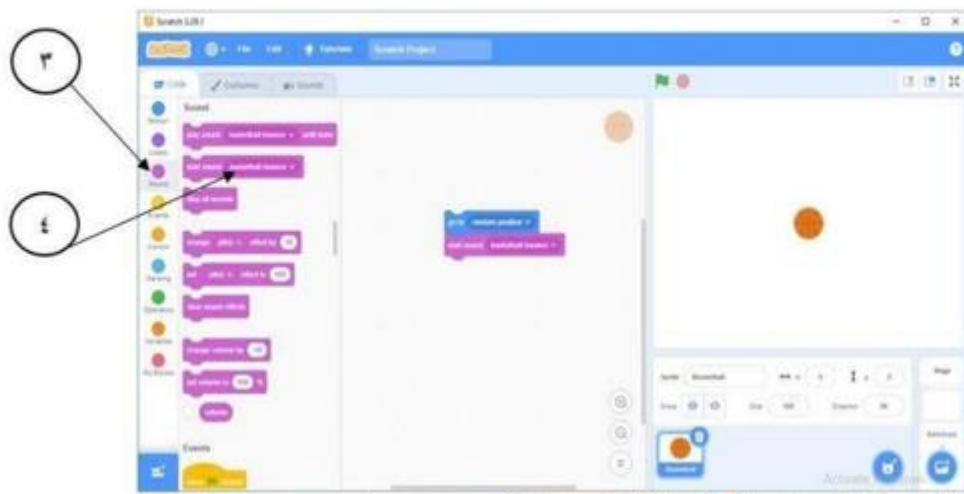
1- From Motion

2- Choose the Go to random position command



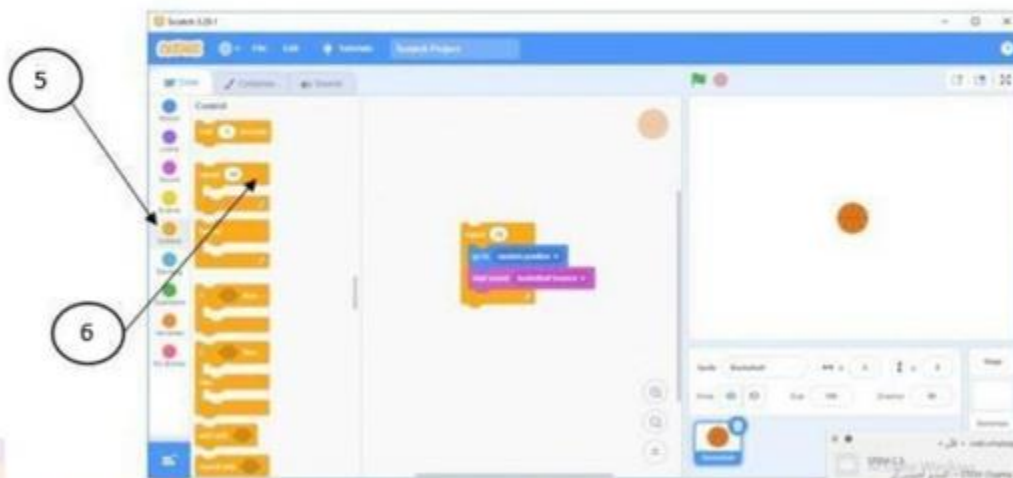
3- From Sound

4- Choose the command Play sound



5- To repeat the movement 10 times from Control

6- Choose the Repeat command.



To execute the project

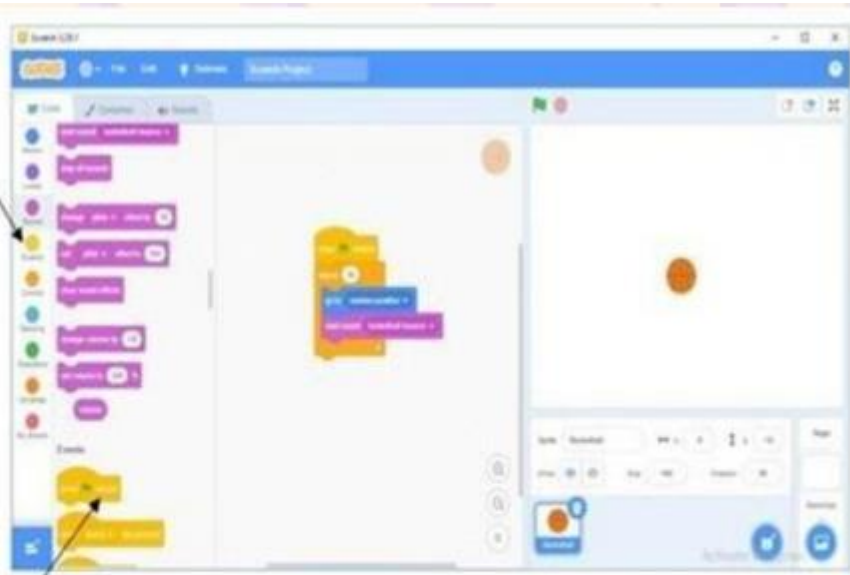
7-From Events

8-Choose the When Clicked command

Test the execution of the project

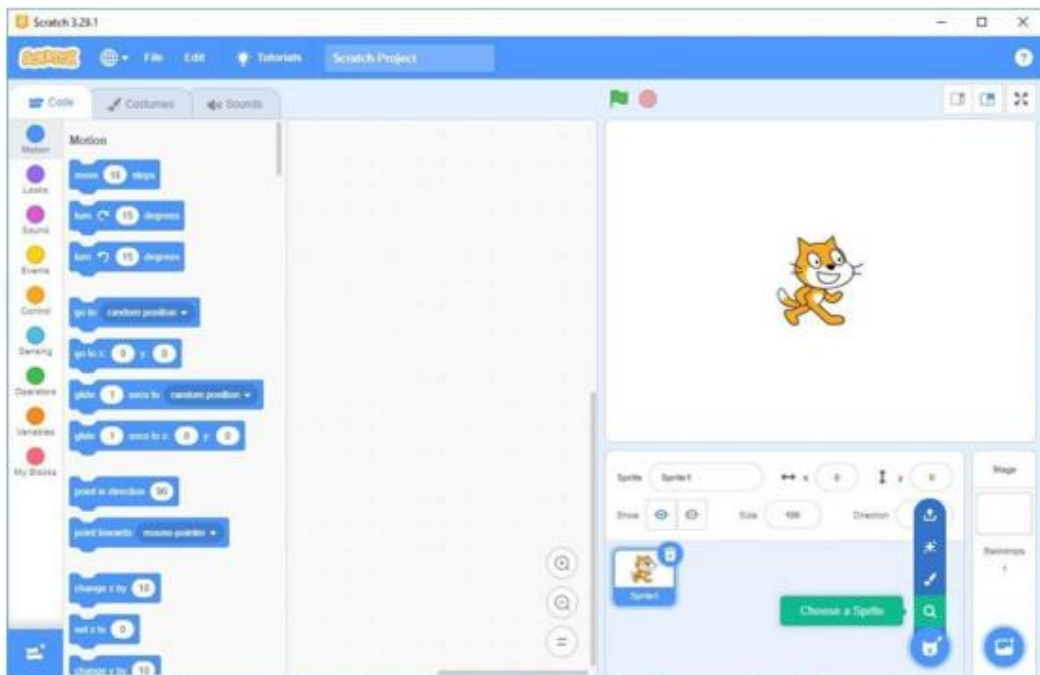
7

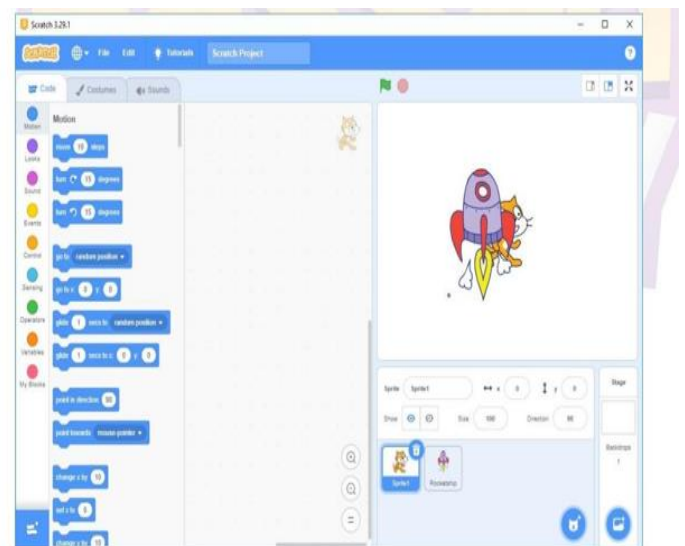
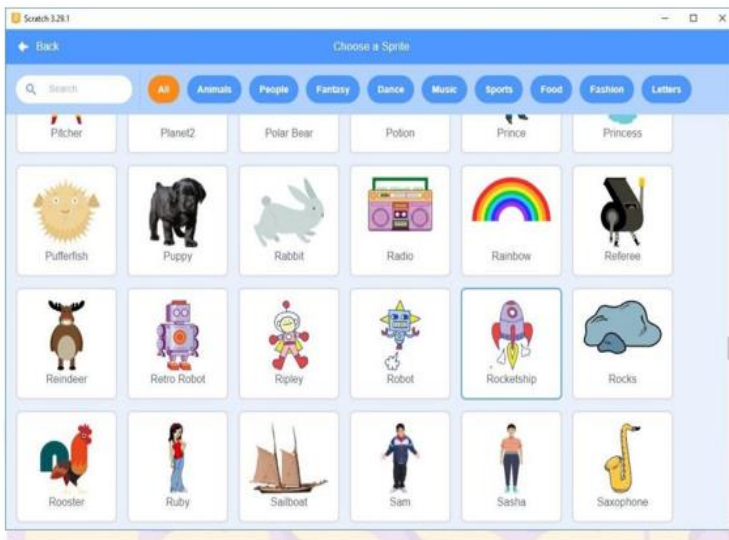
8



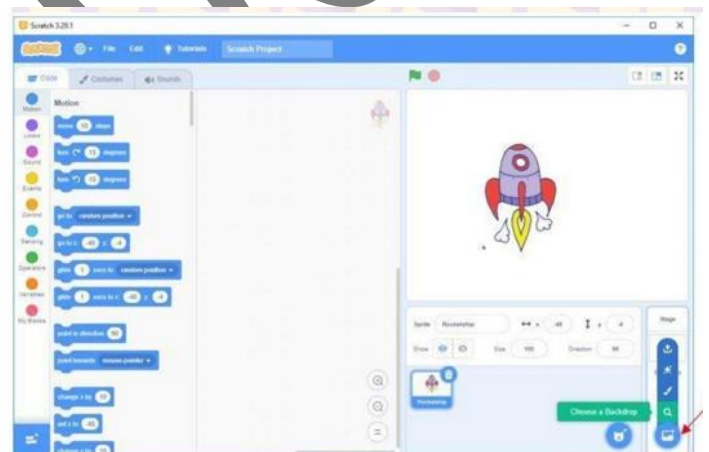
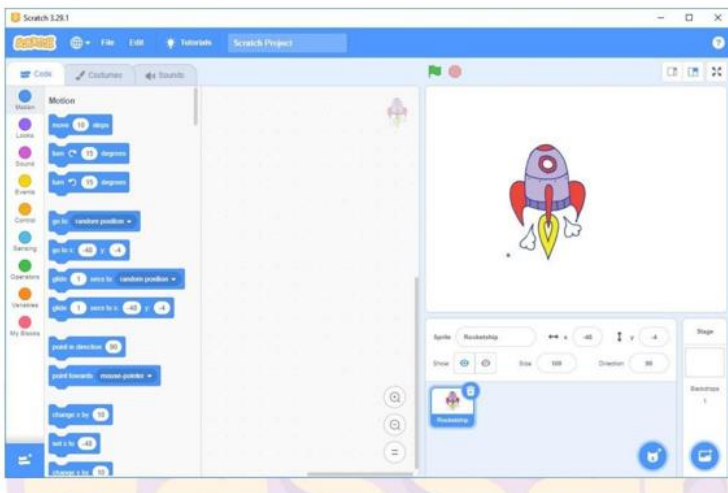
Project (3) Spaceship

-Insert a new sprite Rocketship

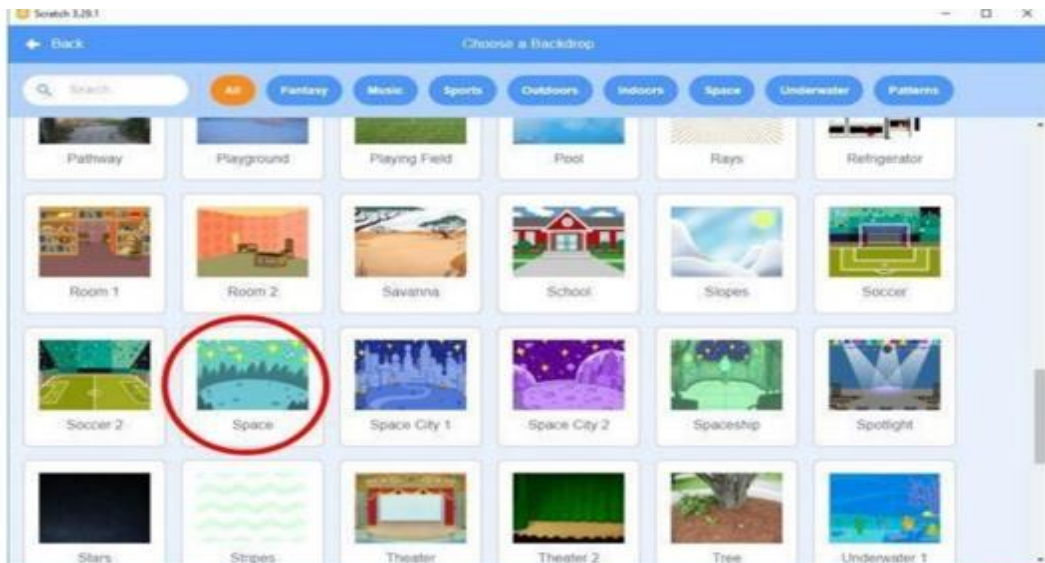




-Remove the cat sprite from the stage.



-Insert a new background by clicking on Choose a Backdrop, browse through the different backgrounds and then choose "Space".



Square Drawing Project:

1. Open a new project: Open Scratch and start a new project.



2. Select **the pen**: We will use the "pen" to draw our picture. In the code area, find the "pen" section and drag the "pen" block down. This block will make the pen start drawing.

3. **Setting Color and Size**: Before you start drawing, you can set the line color and size using the blocks in the "Pen" section. For example, you can use the "Set Pen Color to" block to choose a specific color, and the "Set Pen Size to" block to set the line thickness.

4. **Moving the pen**: Now, we will move the pen to draw the shape we want. use the "GO to X: Y" block to set the starting point, and then use the "GO to X: Y" block again to set the ending point. this will make the pen draw straight line between the two point

5. **Repeating steps**: repeat the previous step to draw more lines and form the shape you want.

Notes:

Drawing different shapes: You can draw any geometric shape by setting the start and end points of the lines appropriately.

Adding details: You can add details to your image such as eyes, mouth, and ears.

Lesson 5 :-Exercises

1 Choose the correct answer from a, b, c or d.

1. The location of the sprite in Scratch on the platform can be determined by
 - a. X and Y axes
 - b. changing of direction
 - c. name change
 - d. using the Play sound brick
2. is an option that allows adding a new sprite in the sprites area.
 - a. Delete the object
 - b. Choose Sprite
 - c. Change Size
 - d. Play sound
3. In the "Moving the Ball" project, choose from Motion to make the ball move randomly.
 - a. when  clicked
 - b. Play sound
 - c. Repeat
 - d. Go to random position
4. is the option required to activate the pen tool.
 - a. Choose Sprite
 - b. Add Extension
 - c. Go to random position
 - d. Change Size
5. A circle can be drawn in Scratch by
 - a. Moving the pen in a straight line
 - b. Repeating short lines at different angles
 - c. Using the Play sound command
 - d. Changing the name of the sprite

2 Complete the following sentences with the appropriate words in brackets. (sprites area - Direction - Repeat - Pen blocks - Go to random position)

1. an area in the Scratch program that contains the sprites used in the project and is used to modify their properties.
2. is a command used to move the sprite to a random location on the platform.
3. is a tool from Add Extension that is used to draw geometric shapes.
4. A block used to repeat a set of commands a specified number of times.
5. is a property that determines the direction in which the object moves on the stage.

What is Python:

Before we start defining Python, we must know that the first version of the language was in 1991. It is a programming language widely used in data science and machine learning, and for developing websites and applications.

Python is a programming language widely used

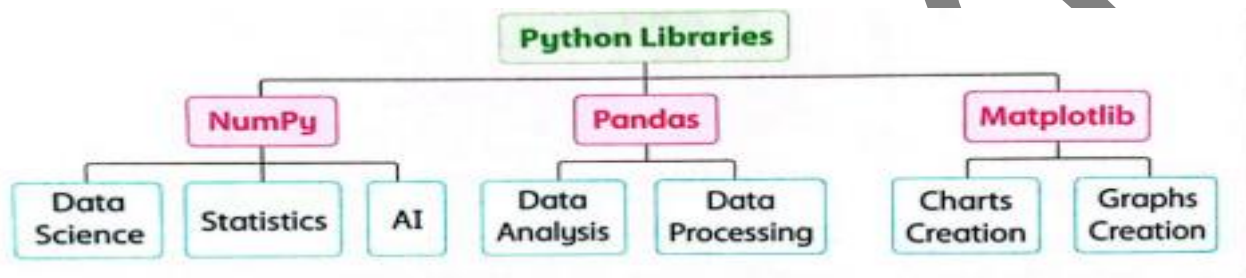
- In data science
- In machine learning
- For developing website and application

Features of Python:

1. **Open source:** Python is free and open source, allowing everyone to use and develop it.
2. **Interpreted language:** Which means that it translates programming codes line by line, so if there are errors in the program code, it will stop working, as programmers can quickly find errors in the codes.
3. **Versatility:** It can be used in developing web applications, data science, artificial intelligence, machine learning, and game programming.
4. **Easy-to-use language:** It is one of the easiest programming languages for beginners because of its simple and organized formula and uses words similar to English, unlike other programming languages.
5. **Integration:** Python can be integrated with other languages such as C, C++, and Java, and it can also be used in developing multi-platform programs.
6. **Libraries:** Python has many libraries that you can use

Python Libraries

They are pre-built codes and functions that help programmers perform specific tasks without having to write codes from scratch, libraries are a powerful tool that increases the efficiency and effectiveness of programming using Python, as they provide ready-made solutions to many common problems or requirements.



like:

NumPy: is a library widely used in data science, statistics, and artificial intelligence.

Pandas: is a library for analyzing and processing data.

Matplotlib: is a library for creating graphs and charts

How to download the program from the official website:

1- Visit the official Python website www.python.org



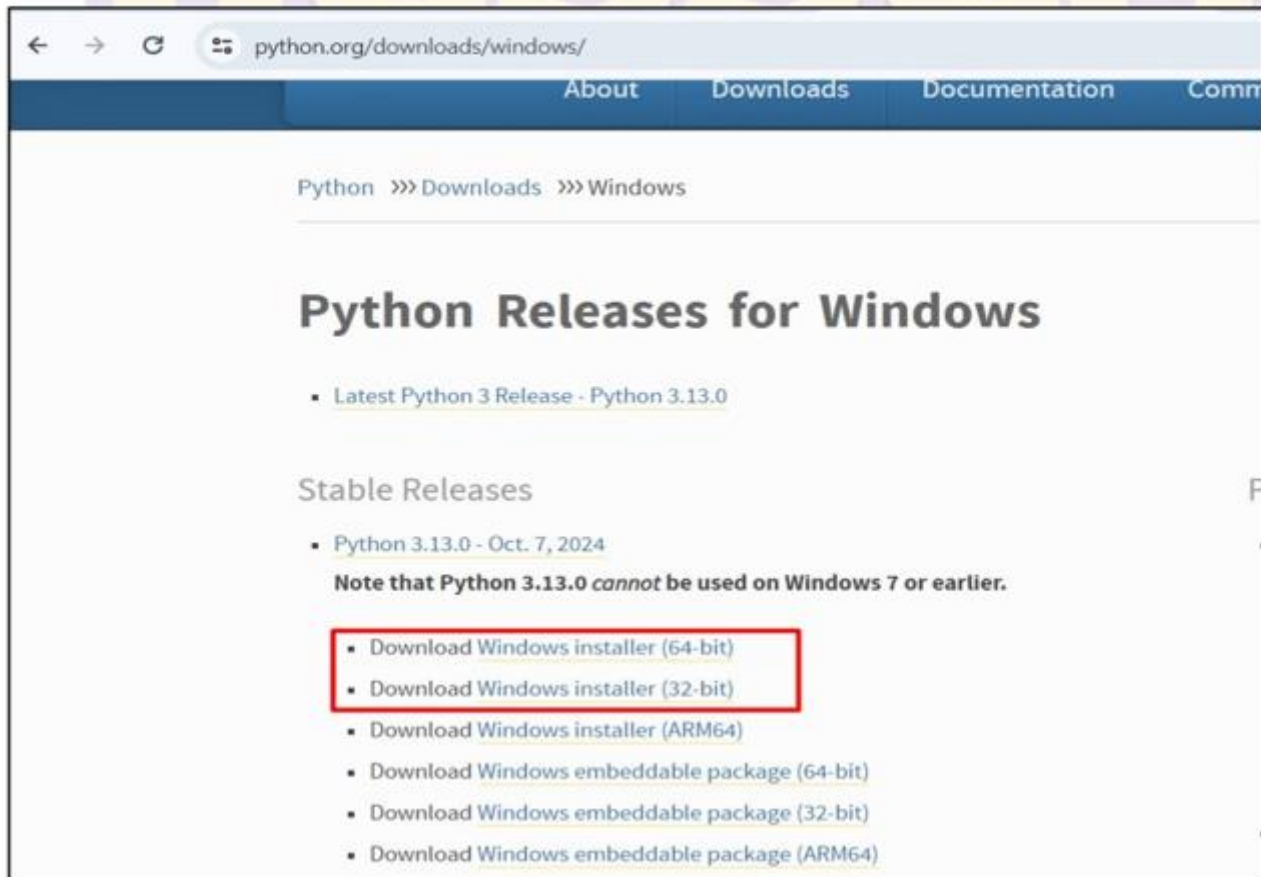
2- Choose "Download"



3- Then choose the system you are working on (Windows, Mac, or Linux).



4- You must choose 64 bit or 32 bit, according to your device specifications.



python.org/downloads/windows/

About Downloads Documentation Comm

Python >>> Downloads >>> Windows

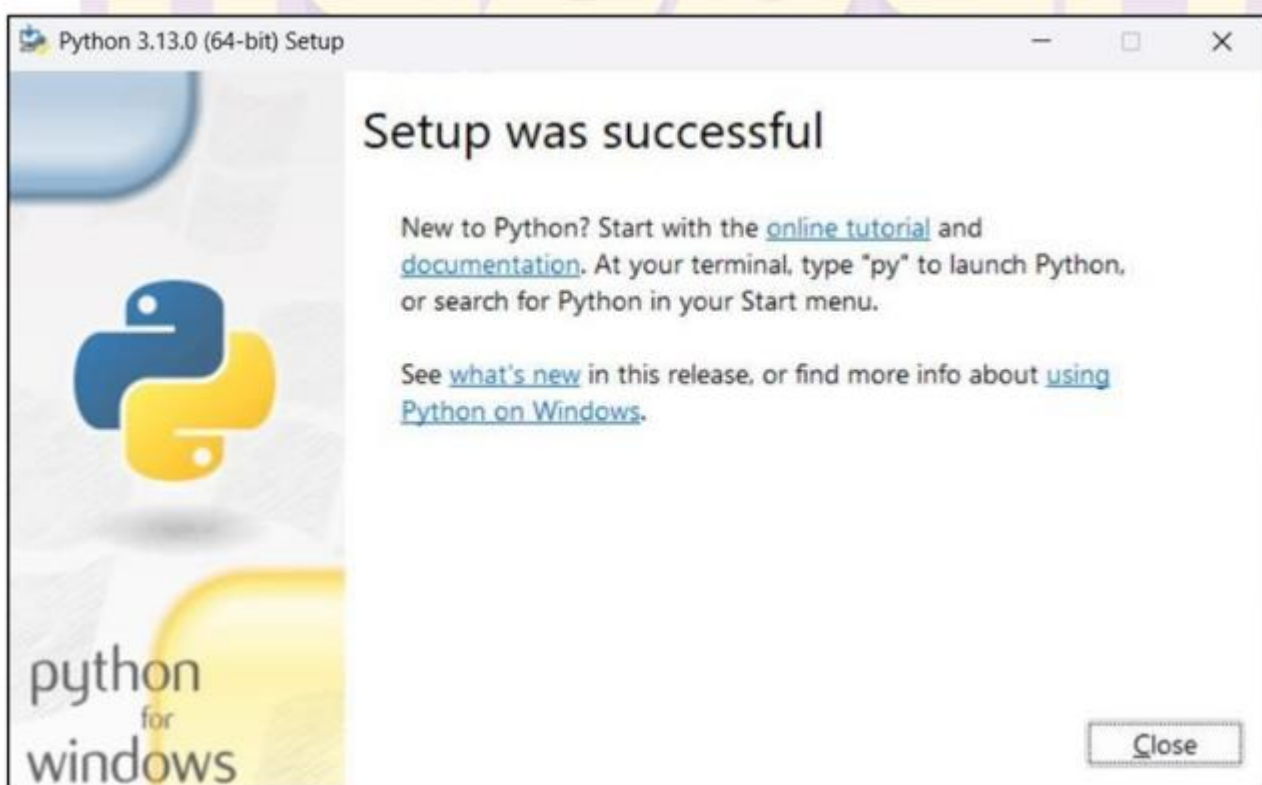
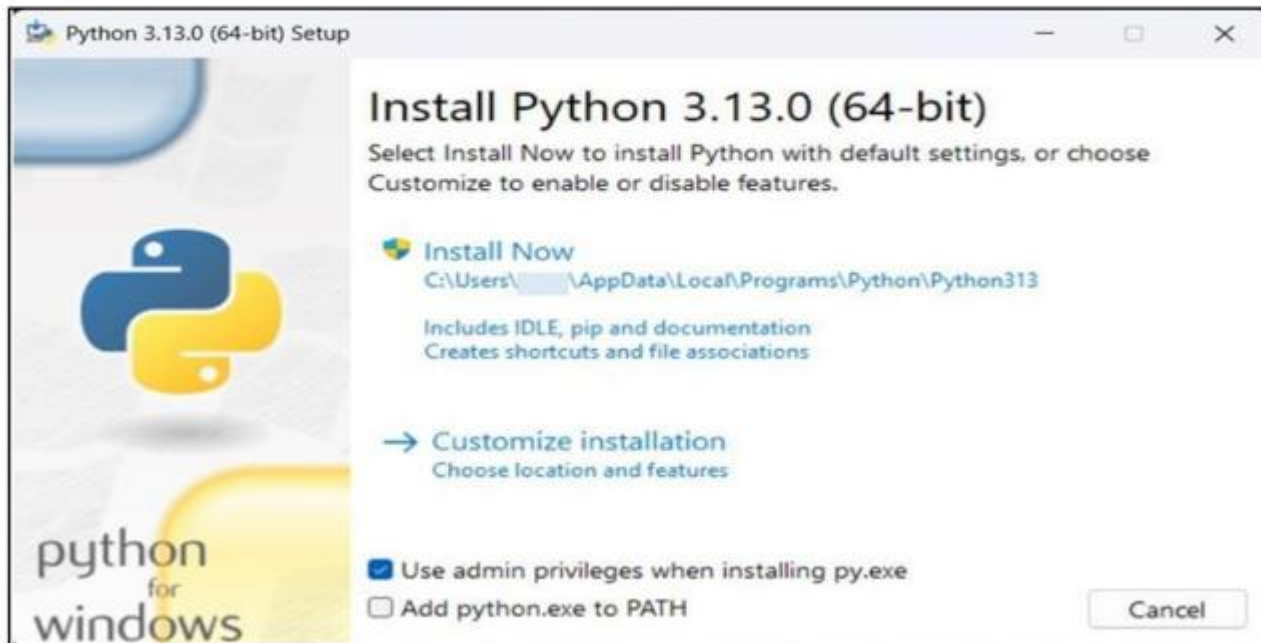
Python Releases for Windows

- [Latest Python 3 Release - Python 3.13.0](#)

Stable Releases

- [Python 3.13.0 - Oct. 7, 2024](#)
Note that Python 3.13.0 cannot be used on Windows 7 or earlier.
 - [Download Windows installer \(64-bit\)](#)
 - [Download Windows installer \(32-bit\)](#)
 - [Download Windows installer \(ARM64\)](#)
 - [Download Windows embeddable package \(64-bit\)](#)
 - [Download Windows embeddable package \(32-bit\)](#)
 - [Download Windows embeddable package \(ARM64\)](#)

5- After downloading, install the program on your device and follow the instructions.



Lesson 6 :-Exercises

1 Choose the correct answer from a, b, c or d.

- One of the advantages of the Python language is that it is
a. easy to use b. hard language
c. closed-source language d. all of the above
- Python can be integrated with other languages such as
a. Java b. C++ c. both (a) and (b) d. HTML
- Python increase the efficiency and effectiveness of programming using Python.
a. graphs b. charts c. games d. libraries
- is a library for analyzing and processing data.
a. Pandas b. NumPy c. Matplotlib d. Mac
- Python is a/an language as it translates programming codes line by line.
a. complex b. interpreted c. medical d. industrial

2 Complete the following sentences with the appropriate words in brackets.

(Programming - charts - robots - Versatility)

1. is one of the features of Python.
2. Python is one of the easiest languages.
3. Matplotlib is a library for creating graphs and

Lesson 7: - variables in python

what are variables

variable in programming language express a reserved place in memory to store and save a specific value, where the value can change

Conditions for naming variables in Python:

1. The variable name **begins** with a letter or an underscore _.
2. The change name contains letters (A-Z) or numbers or an underscore _
3. **Reserved words** may not be used in Python because they express specific values that the program understands (example: False) A reserved word within the program is a word that indicates a reserved value (logical value).
4. When writing a variable name, you must take into account placing the variable names in upper and lowercase letters (example: TAHER, Taher, tahir, TaheR) In the previous example, the variable names refer to four variables and not one variable.

Types of variables in Python

1- **Numbers:** Used to store numerical values such as integers (int) and decimals (float).

Integer variables:

X= 5

Y= 10

Decimal variables:

Z= 5.25

A= 8.32

2- **Strings:** Used to store texts such as names and addresses.

Texts are placed between single quotes ' ' or double quotes " "

Name = "Taher"

City = 'Cairo'

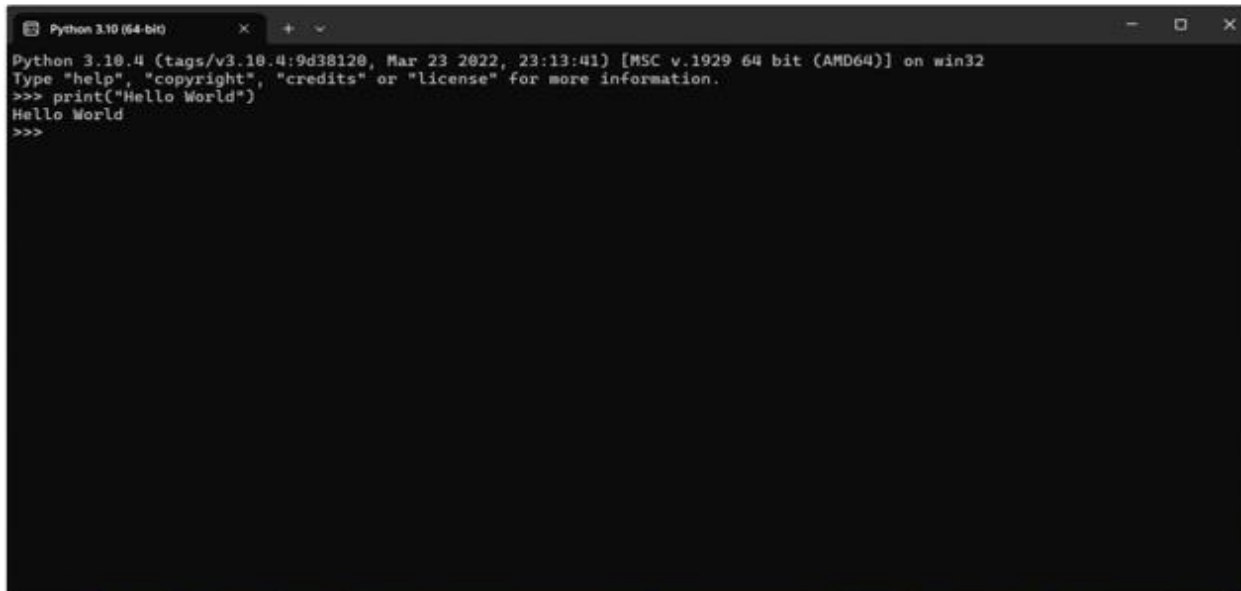
3- **Booleans:** A data type that contains only two values True or False Often used in comparisons and decision making in codes

Is_taher_student = False

Is_taher_a_teacher = True

Python program interface

- 1- **Through the interactive Python interface (Python Shell):** You can write simple codes and execute them directly to see the results.



```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World")
Hello World
>>>
```

- 2- **Text editor:** It allows you to write longer and more complex codes and save them to run later.

Notice

- The interactive python interface is installed when you install the python language, there is no need to download it.
- Unlike a text editor that must be download from the internet, such as visual studio and pycharm.

To know the type of the variable you can use **the type ()** function

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> X = 5
>>> Y = 10
>>> Z = 5.25
>>> A = 8.32
>>> name = "Taher"
>>> city = 'Cairo'
>>> type(X)
<class 'int'>
>>> type(Y)
<class 'int'>
```

Simple Python Code Using Variables

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> name = "Omar"
>>> address = "Cairo, Egypt"
>>> age = 13
>>> print("My name is", name)
My name is Omar
>>> print("I live in", address)
I live in Cairo, Egypt
>>> print("I am", age)
I am 13
>>>
```

The **print function ()** in Python is one of the most commonly used functions, used to display text or values on the output screen. It can be used to display text, variables, or even the results of mathematical operations.

Lesson 7 :-Exercises

1 Choose the correct answer from a, b, c or d.

1. Textual variables can store
a. strings
b. boolean
c. numbers
d. none of the above
2. function is used to display text or values on the output screen.
a. Type ()
b. print ()
c. Input ()
d. output ()
3. Through..... the codes are written, saved and later executed.
a. browser
b. text editor
c. photoshop
d. paint
4. The function "....." is used to know the variable type.
a. type ()
b. print ()
c. input ()
d. output ()

2 Complete the following sentences with the appropriate words in brackets.

(interactive Python interface – underscore – strings – Booleans)

1. are a type of variable that takes values true or false.
2. The is installed when Python is installed.
3. The variable name begins with a letter or an

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. A variable is an unreserved place to store fixed values that cannot be changed. ()
2. When naming a variable you must start with a number. ()
3. Variable values can be changed by code. ()
4. Reserved words may be used in Python because they express certain values that the program understands. ()
5. Boolean values take values (3 – 4 – 5). ()
6. The use of uppercase and lowercase letters can be ignored when naming a variable. ()